REMARKS

Claims 1-8 are pending in the present application. Claims 1-8 are rejected. No new matter has been entered.

Double Patenting

Claims 1, 3 and 5 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-6 and 9 of copending Application No. 10/567,902.

Applicants submit that the inventors common to both the cited reference and the present invention appear because there was a joint research agreement between Ube Industries and Sanyo Electric Co. Applicants submit that the double patenting rejection can be removed by submitting a Terminal Disclaimer under 37 C.F.R. §1.32(d) showing that the conflicting application claims an invention made as a result of activities undertaken within the scope of joint research agreement. Such Terminal Disclaimer is included herewith.

Claim Rejections - 35 U.S.C. §103(a)

Claim 1 is rejected under 35 U.S.C. §103(a) as being unpatentable over Hamamoto et al. (JP 2002-124297) in view of Noh (US 2004/0101762).

With regard to claim 1, the Examiner admits that Hamamoto et al. fails to specifically state the amount of vinylene carbonate used. The Examiner concludes that it would have been obvious to add the 0.1-50 wt% of vinylene carbonate of Noh to the nonaqueous electrolyte of

Hamamoto et al. in order to inhibit swelling at high temperature and to improve cycle life characteristics of the battery (paragraph [0020]).

Claim 2-6 are rejected under 35 U.S.C. §103(a) as being unpatentable over Hamamoto et al. in view of Noh as applied to claim 1 above, and further in view of Kanekiyo et al. (JP 2002-313419). The Examiner concludes that it would have been obvious to add negative electrode active material having a packing density of 1.34g/mL of Kanekiyo et al. to the battery of modified Hamamoto et al. in order to increase battery capacity (paragraph [0010]). The Examiner further concludes that it would have been obvious to add the nonaqueous electrolyte containing 25-40% EC, 25-60 vol% MEC/EMC, and 10-40 vol% DEC of Kanekiyo et al. to the nonaqueous electrolyte of modified Hamamoto et al. in order to optimize the ionic conductivity/electric property of said nonaqueous electrolyte (paragraph [0012])

Claim 7 is rejected under 35 U.S.C. §103(a) as being unpatentable over Hamamoto et al. in view of Noh, as applied to claim 1 above, and further in view of Kinoshita et al. (US 2004/0091780). The Examiner admits that modified Hamamoto et al. fails to teach a metallic case with specified thickness. The Examiner concludes that it would have been obvious to add the metallic case having thickness of 0.5 mm or less Kinoshita et al. to the nonaqueous secondary battery of modified Hamamoto et al. in order to provide an airtight environment for said nonaqueous electrolyte battery (abstract) and thereby prevent said electrodes and said electrolyte form being expose contaminants.

Applicants note that the present invention utilizes the combination of vinylene carbonate and di(2-propynyl) oxalate, the vinylene carbonate being added in an amount of 0.1 to 3.0% by mass, and the di(2-propynyl) oxalate in an amount of 0.1 to 2.0% by mass, relative to the mass of said nonaqueous electrolyte.

Applicants submit that the present invention is associated with unexpectedly superior results associated with the claimed combination of vinylene carbonate and di(2-propynyl) oxalate in the claimed amounts.

The present invention of claim 1 is a non-aqueous secondary battery, of which the electrolyte contains 0.1~3 wt% of vinylene carbonate (VC) and 0.1~3 wt% of di(2-propynyl) oxalate (D2PO). The battery shows excellent charge-discharge cycling characteristics at high temperature, and little swelling as remarkable effects, and it is not obvious over Hamamoto et al. in view of Noh et al.

Table 1 of the specification shows that if the content of either VC or D2PO is not within the range of claim 1, for instance, content of VC or D2PO is 0, capacity and charge-discharge characteristics are not enhanced and swelling is not reduced.

To show the results of the variation of VC, the specification includes Examples 1-4, showing the relative effects of VC at 0.1%, 1%, 2%, and 3%, compared with Comparative Example 3 (VC at 0%) and Comparative Example 4 (VC = 4%). Each of these amounts of VC is matched with 1.0% of D2PO, which is approximately in the middle of the claimed range of D2PO of 0.1 to 2%. Therefore, data points are included below the claimed VC range of 0.1 to

3% (0%), at the bottom of the claimed range ((0.1%), middle (1% and 2%), top of the claimed range (3%), and above the claimed range (4%).

Similarly, the specification includes Examples 5-7, showing the relative effects of D2PO at 0.1%, 1% and 2%, each combined with 1% of VC, compared with Comparative Example 5 (D2PO = 0%, VC = 1%), Comparative Example 2 (D2PO = 0%, VC = 2%), and Comparative Example 6 (D2PO = 3%, VC = 1%). Therefore, data points are included below the claimed D2PO range of 0.1 to 2% (0%), at the bottom of the claimed range ((0.1%), middle (1%), top of the claimed range (2%), and above the claimed range (3%).

Such evidence of unexpected results should rebut the assertion of obviousness under 35 U.S.C. §103(a).

The Examiner asserts that Applicant's arguments filed on November 26, 2008 with respect to claims 1-7 are not persuasive. The Examiner disagrees with the Applicants' argument that a person of skill in the art would have recognized by reading Noh that addition of VC to electrolyte does not reduce swelling of a secondary battery but enhances swelling (Applicant's Response, page 8) and with Applicant's statement that this argument is supported by comparing Examples 2 & 5, by comparing Comparative Examples 2 & 3, and by comparing Examples 6 & 7 as shown in Tables 1 and 2 of Noh (Applicant's Response, page 8).

The Examiner notes that the Applicants state in the Applicant's Response that "the effect of disclosed invention of Noh is enhancing electrochemical characteristics and preventing swelling of the battery" (Applicant's Response, page 7). Applicants acknowledge such statement. However, Applicants counter that such statement does not mean that *the VC* of the cited

reference causes the effect of the invention; it is easily possible that the VC has no positive effect on this aspect of invention of the cited reference.

The Examiner asserts that Examples 2 and 5 of Noh are not truly comparable because multiple variables are varied simultaneously. Specifically, Example 2 contains VC while Example 5 does not, while both also contain different amounts of additives "Formula (5)" and "Formula (6)" (Tables 1 & 2 of Noh). Similarly, Examples 6 & 7 are not comparable because multiple variables are varied simultaneously. Specifically, Examples 6 & 7 contains different amounts of additives "Formula (5)" & "Formula (6)" in addition to different amounts of VC. Additionally, Comparative Examples 2 & 3 of Noh are not comparable because Comparative Example 2 contains VC while "Comparative Example 3 contains VS" {sic}. The Examiner therefore finds that Applicant's argument is not persuasive.

However, Applicants submit that the Examiner's conclusion was based on an *incorrect printing of Patent Application Publication of Noh.* Applicants attach hereto a copy of Table 1 of filed specification of Noh, which was obtained by PAIR, which remarkably shows that electrolyte of Comparative Example 3 does not contain vinyl sulfone (VS). Table 1 of the Publication is roughly edited and is easily misread, and it is unclear which electrolyte of Comparative Example contains 0.25 wt% of VS. It is Comparative Example 4 of which the electrolyte contains VS, but the Examiner misread that the electrolyte of Comparative Example 3 contains VS.

The comparison obviously shows that addition of VC alone into electrolyte does not control swelling. The filed specification of Noh clearly shows that both electrolyte of Comparative Examples 2 and 3 do not contain VS, and the Examples are worth comparing with Examples of the present application.

Further, concerning to cycle life, Noh discloses data of Example 4 and Comparative Example 1 alone. The difference between electrolyte of Example 4 and Comparative Example 4 not only existence of VC, but also existence of "compound of Formula (5)", and it is impossible to compare cycle life between batteries of the examples exactly. Therefore, those skilled in the art would not have combined the concept of adding VC of Noh to the nonaqueous electrolyte of Hamamoto et al. to inhibit swelling of the battery.

Furthermore, Noh discloses in [0039] as "The addition effect is not sufficient when the vinylene carbonate is used less than 0.1 wt %," but what kind of effect is expected by addition of vinylene carbonate is not disclosed in Noh clearly. In this point, one skilled in the art would not add the concept of Noh to the electrolyte of Hamamoto et al. to inhibit swelling or elongating cycle life of battery, either.

Hamamoto et al. does not instruct nor suggest method of enhancing characteristics of nonaqueous secondary battery at high temperature, and Noh does not instruct nor suggest effect of adding vinylene carbonate (VC) to electrolyte. Therefore, the unexpectedly superior effect of the invention of claim 1 would not have been anticipated by one skilled in the art, and the invention is nonobvious. Furthermore, as far as the invention of claim 1 is nonobvious, inventions of claims 2 to 6 are also nonobvious.

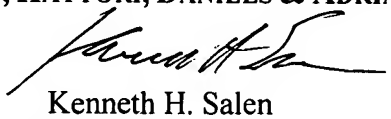
In view of the aforementioned remarks, Applicants submit that the claims are in condition for allowance. Applicants request such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP



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KHS/adp
Attachment: Table 1
Terminal Disclaimer

Table 1

	Organic solvent (volume %)		Additive compound		vinylene carbonate	vinyl sulfone
	EC/EMC/PC/FB (volume ratio, 30/55/5/10)	γ- butyrolactone (GBL)	Formula (5)	Formula (6)		
Example 1	70	30	1	2	-	-
Example 2	50	50	1	2	-	-
Example 3	30	70	1	2	-	-
Example 4	70	30	1	-	2	-
Example 5	50	50	2	1	1	-
Example 6	30	70	2	-	2	-
Example 7	30	70	3	-	1	-
Example 8	30	70	-	2	2	-
Example 9	50	50	2	-	-	0.25
Example 10	50	50	-	2	-	0.25
Comp. Example 1	30	70	-	-	-	-
Comp. Example 2	50	50	-	-	-	-
Comp. Example 3	50	50	-	-	2	-
Comp. Example 4	50	50	-	-	-	0.25
Comp. Example 5	100	-	-	-	-	-

$LiCoO_2$ having an average particle diameter of 10 μm as a positive active material, Super P (acetylene black) as a conductive agent, and polyvinylidenefluoride (PVdF) as a binder were mixed in a weight ratio of 94:3:3 in N-methyl-2-pyrrolidone (NMP) to prepare a positive slurry. The slurry was coated on an aluminum foil, dried,